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FEDERAL - STATE - PRIVATE COOPERATIVE

SNOW SURVEY and WATER SUPPLY FORECASTS for MONTANA & NORTHERN WYOMING

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE, and MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, U.S. Geological Survey, National Park Service, State Engineers of Montana and Wyoming and other Federal, State, and private organizations.

JAN. 1, 1961

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Cooperative Snow Survey and Water Supply Forecast Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, 30 does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

	PUBLISHED BY SOIL	CONSERVATION SERVICE	
REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
COLORAGO AND STATE OF UTAH	MONTHLY (JANMAY)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER AND OTHER AGENCIES
COLUMBIA	MONTHLY (JANMAY)	BOISE. IDAHO	IOAHO STATE RECLAMATION ENGINEER
UPPER MISSOURI AND STATE OF MONTANA	MONTHLY (FEBMAY)	BOZEMAN MONTANA	MONT. AGR. EXP. STATION
WEST-WIDE	OCT. 1. APR. 1. MAY 1_	PORTLAND, OREGON	ALL COOPERATORS
STATES			
AL ASK A	MONTHLY (MAR MAY)	PALMER. ALASKA	ALASKA S.C.D.
AR I ZON A	SEMI-MONTHLY (JAN. 15 - APR. 1)		SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEBMAY)	FORT COLLINS, COLORAGO	COLO. AGR. EXP. STATION COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (FEBMAY)	BOISE, IDAHO	TOAHO STATE RECLAMATION ENGINEER
NE VADA	MONTHLY (FEBAPR.)	. RENO, NEVADA	NEVAGA DEPT. OF CONSERVATION AND NATURAL RESOURCES DIVISION OF WATER RESOURCES
ORE GON	MONTHLY (JANMAY)	PORTLAND, OREGON	ORE. AGR. EXP. STATION OREGON STATE ENGINEER
WASHINGTON-	MONTHLY (FEBMAY)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB. JUNE)	. CASPER. WYOMING	WYOMING STATE ENGINEER
Copies of these various report	ts may be secured from:	Head, Water Supply Forec Soil Conservation Servic 209 S. W. Fifth Ave., Po	e.
	PUBLISHED BY	OTHER AGENCIES	
REPORTS	ISSUED		AGENCY
BRITISH COLUMBIA			RIGHTS BR., DEPT. OF LANDS AND T BLDG., VICTORIA, B.C., CANAOA

_MONTHLY (FEB.-MAY)___

__ CALIF. DEPT. OF WATER RESOURCES, SACRAMENTO, CALIF.

FEDERAL-STATE-PRIVATE COOPERATIVE

SNOW SURVEYS and WATER SUPPLY FORECASTS

For

MONTANA AND NORTHERN WYOMING

(Upper Missouri and Upper Columbia River Basins)

Report Prepared Ву

and

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U. S. Department of Agriculture Soil Conservation Service and Montana Agricultural Experiment Station Bozeman, Montana

Issued By

H. D. Hurd State Conservationist of Montana

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R. E. Huffman Director Montana Agricultural Experiment Station



WATER SUPPLY OUTLOOK FOR MONTANA January 1, 1961

The January first snow-pack is considerably below average. At most snow courses the snow-pack is less than it was last January. At present the water supply outlook is poor. Snowfall during the remaining winter months must be considerably above average in order to produce an adequate water supply for this coming irrigation season.

There are a few bright spots among the key stations measured on or about January first. The snow-pack on the Yellowstone and Madison basins is considerably greater than last season, but is still below average.

This season's snow-pack overlies dry mountain soils and will have a significant effect on the 1961 runoff. Rivers and streams whose headwaters are covered with the deeper soil mantles will show the greatest effect as much of the water accumulated in the snow-pack will be required to prime the soil.

Carryover storage in irrigation reservoirs is below average, reflecting the increased irrigation demand and below average streamflow during the 1960 season.

On the Upper Missouri River basin in Montana, snow cover is 180 percent of last year's and 78 percent of the average January first snow-pack.

On the Columbia River basin in Montana, snow cover is 108 percent of last year's and 80 percent of the average January first snow-pack.

East of the Continental Divide the 1961 January first snow survey measurements as compared with last year's January data and the 1943-57 average for major river basins are: Beaverhead-Jefferson, 105 and 69 percent; Madison-Gallatin, 332 and 82 percent; Missouri Main Stem (Toston to Fort Benton), 75 and 62 percent; and Yellowstone (Yellowstone Park to Billings), 303 and 85 percent.

West of the Continental Divide comparisons are: Flathead River basin, 77 and 86 percent; Upper Clark Fork (Butte to Missoula), 79 and 64 percent; and Lower Clark Fork (Missoula to Idaho boundary), 133 and 87 percent.







INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

						IN	DEX	TO 1	MONTAN	A &	NC)RT	HE	ΚN	VVIC		3 511				Locati	on	Ponge.	Record	Measuring H	Measured
Drainage Rasin and Course Name	Hontana Number	Slev.	Locat Sec. Lat.	den	Range Long.	Record Began	MeasuringDates	Measured By	Drainege Basin and Course Name	Montana Number	Elov.	Locati Soo. Lat.	Twp.	Range Long.	Record Bogan	Measuring Datos	Measured By	Drainage Basin and Course Name	Montana Numbor	Elov. MISSOURI	Lat. RIVER D	TWP.	Long.	Began	Dates	Ву
JEFFERSON SIVER				ER DRAIN						!	MISSOURI I	RIVER DR	AINAGE	(cont.)				(TONGUE RIVER	ont.)			ent per a si	Woo	1956	2,3,4,5	1
(SOCK-SEAVERHE	EAD)								(UPPER YELLOW		#800	2	88	18E	1937	4	1	Horse Trail Div.	7E19 7E16	9200	29 7	55H 52N 55N	90W 86W 89W	1956 1956	2,3,4,5	1
Lakeview Ridge Lakeview Canyon	1153	7400 6930	27 26	14S 14S	2W 2W	1948 1948	3,4,5 3,4,5	10	Camp Senie Canyon	9D1 10E3 10D7	7890 7750 7400	44°-441°		110°-30'	1938 1937	1,2,3,4,5 1,2,3,4,5	6	North Tongue Sibley Lake	7E15 7E11	8800	17 10 19	55N 55N	88W 87W	1956 1956	2,3,4,5 2,3,4,5	1
Limekiln white Pine Ridge	1252 1251	6950 8850	18	158 148	9W 9W	1948 1948	3,4 3,4	1	Cooke City Crevice Mt.	10D7 10D5 10D6	8400 8000	22 22	9S 7S	9E 12E	1935 1940	بار3 بار3 کیا د د د	1	Sucker Creek Stoamboat Point	7E12 7E10	9000 7500 8500	32	5EN 5LN	87W 88W	1956 1956	2,3,4,5 2,3,4,5	1
(HONDS PROIRES	<u>s</u>)								Independence Lake Camp Lupine Creek	10E4 10E1	7850 7300	144°-341		110°-241		1,2,3,4,5 1,2,3,4,5 2,3,4,5	6 1,4	Wood Rock O.S.	7El3	0,500	,					
Bloody Dick Gold Stone	13D10 13D9	7600 8100	12 11	8S 8S	16W 16W	1948 1948	3,4 3,4	1	Lodgepole West Rosebud	9E1 9D2	8200 7500	32 10	56N 7S	106W 16E	1960	1,2,7,1,5	li		6E2	8200	6	L7N	8411	1956 1956	2,3,4,5 2,3,4,5	1
Lemmi Pass Terrell Greek	13012	7480 6650	9	10S 9S	15W 15W	1948 1948	3,4 3,4	1	(SHIELDS RIVE	1003	6500	10	LN	10E	1938	3,4	1	Crazy Woman Muddy Creek O.S. Munkere Pass	6E1 7E8	7800 9700	77	48N	85พ 85พ 81ม	1950 1956	2,3,4,5	î 1
Trail Greek Selway Junction	13011	7090 6800	15 27	10S 8S	15W	1948 1948	3,4 3,4	1	Porcupine LOWER YELLOWSTONE		0,00							North Powder #2 Onion Gulch	7E36 7E27	8300 8100	20 31 36	47н 48н 51н	85W 85W	1956 1950	2,3,4,5	1
(<u>BIG HULL</u>)									(WIND RIVER)									Soldier Park Sour Dough	7E5 7E6	8 700 8 50 0	17	49N	8ĹW	1936	2,3,4,5	1
Big Hole Pass Big Hole Pass-Be.	1303 1304	7240 6900	28 24	3\$ 3\$	18W 18W	1948 1948	3,4 3,4	1	Big Warm	9F12 10F8	8800 9200	36 23	կ2N ևևN	109W 110W	1955 1939	2,3,4,5 2,3,4,5	1			COL	UMBIA R	IVER BASI	N.			
East Boundary Shbbons Pass	1305 1302 1308	6700 7100	22	38 28 78	17W 19W 16W	1948 1934 1948	3,4 1,2,3,4,5	1,3	Brooke Lake #3 Burroughs Creek Dinwoodie	9F4 9F10	8800 10000	15 21	43N 39N	107W 105W	1948 1948	2,3,4,5 2,3,4,5	1	KOOTENAI RIVER				0011	tion	1956	4,5,5	2
Jahrke Creek Miner Forks Miner Lake	1306 1307	7340 7300 6720	25 24 10	6S 6S	17W 16W	1948 1945	3,4 3,4 3,4,5	1	Dry Creek DuNoir	9F9 9F6	9500 8750	34 27	ЦN Ц2N	108W	1948 1940	2,3,4,5 2,3,4,5	1	Baree Creek Baree Mountain	15811 1581	5500	1	25N 25N 36N	30W 31W 29W	1937 1937	4,5,5 3,4,5,5	2 2
(MISE RIVER)		0,20				-/-/	27-72		East Fork Geyser Creek	9F13 9F7	9200 8500	23 12 24	FIN FIN FFN	104W 108W 108W	1956 1948 1948	2,3,4,5 2,3,4,5 2,3,4,5	1	Red Mountain Weasel Divide	15A1 14A7	5000 5450	8	37N	244	1955	4,5,5	1,2
Anderson Mdw.	13014	7000	18	35	12W	1948	3,4	1	Little Warm Sheridan R.S. #1	9F8 9F5 9F14	9500 7500 7500	3	42N	109W 109W	1939 1955	2,3,4,5	1	FLATHEAD RIVER	138ìliA	5000	11	191	12₩	1951	2,3,4,5	2
Elk Horn Wise River	13D15 13D13	6300	15 15	45 25	12W 12W	1935 1948	3,4,5 3,4	1	Sheridan R.S. #2 T-Cross Ranch Togwotee Pass	9F3 10F9	8000 9600	1 29	և3N ևևN	107W 110W	1940 1936	2,3,4,5 2,3,4,5	1	Basin Cresk Big Cresk Brush Cresk	1383 14Ah	6.120 2000	647		18W 26W	1941 1937	5، بار3 5، بار3	1,2
(RUBY RIVER)									(POPO AGIE RI		Lng							Cattla Queen Desert Mountain	13A1 13A2M	1,700 5600	7 24	35N 31N	17¥ 19₩	1939 1937	5 ربار 3 5 بار 3 رور 1	1,2
Flashlight	1203	6950	22	88	7⊭	1945	3,4,5	1	Blue Ridge	802 805	9500 6500	23 24	31N 32N	101W	1939 1955	2,3,4,5 2,3,4	1	Hell Roaring Div. Holbrook	14A3 13B13A	577'0 4530	35 18	32N 21N 37N	22₩ 13₩ 22₩	1942 1951 1954	1,2,3,4,5 4,5	2 6
MADISON RIVER									Bruce's Camp Hobb's Park Mosquito Park R.S	963	10000	22	2S 2S	3W 3W	1948 1940	2,3,4,5	1	Kiehenehn Logan Creek	14A6 14A5	3886 4300 5250	14 34 34	30N 30N	24W 14W	1937 1934	3,4,5 1,2,3,4,5	2
Hebgen West Yellowstone	11E5 11E7	6550 6700	22 34	113 135	3E 58	1934 1934	1,2,3,4,5	3	Sawmill Glade South Pass	801 803	8500 9000	3 13	31N 30N	101W	1939 1939	2,3,4,5	1	Marias Pase Mineral Creek Quintonkon	13A5N ,13A16 13A13	4000	29 11	35N 26N	17# 17#	1957 1951	3,4,5 2,3,4,5	6 1,2
Nirris Basin	1032	7500	1770 1771 a		1100-421	1936	3,4	6	St. Lawrence Trout Creek	9F11 9G2	84 00	26 5	1N 2S	7M	1940 1948	2,3,4,5 2,3,4,5	1	Spotted Bear Mt. Strawberry Lake	13B2M 13A10	7000 6500	23 11	25N 28N	15₩ 19₩	1948 1948	3,4,5 3,4,5	1,2
									(OWL CREEK) W		8900	6	43N	102W	1948	2,3,4,5	1	Trinkus Lake Trout Lake	13B1 13A12M	6500 3600	9 21	25% 28N	17W 17W	1948 1948	3,4,5 3,4,5	1,2
GALLATIN RIVER									Beavers Mill Owl Creek	9F2 8F1	8700	36	43N	101W	1948	2,3,4,5	1	Twin Creeks Upper Holland Lk.	13B11 13B5	3580 7000	28	26N	16W 16W	1951 1948	2,3,4,5 3,4,5	1,2
Devil's Slide Hood Meadow	10D4 10D3	8100 6600	14 22	58 48	6E 6E	1935 1935	2,3,4,5 2,3,4,5	2,1 2,1	(GREYBULL RIV	_					2010	221 5	,	CLARK FORK Baree Creek	15811	5500	6	25N	30W	1956	4,5,5	2 2
New World Zl-Mile	1001 11E6	6700 7150	24 1	3S 11S	6E 5E	1939 1934	1,2,3,4,5	7	Timber Creek #1 Timber Creek #2	9E2 9E3	8800 8800 8000	25 - 25 28	47N 47N 46N	103W 103W 103W	1948 1955 1939	2,3,4,5 2,3,4,5 2,3,4,5	1	Barae Mountain Black Pine	15B1 13013	6000 7100	1 25	25% &i	31W 15W	1937 1960	4,5,5; 3,1:,5	2
MISSOURI RIVER MAIN	N STEM								Wood River #1 Wood River #2	9F1 9F15	8000	28	46N	103W	1956	2,3,4,5	ī	Coyote Hill El Dorado Mine	13310 1309	4200 7800	12 23	184 84	16W	1952 1949	1,2,3,4,5	2
Chessman Reservoir		6200	2	8n	5W	1936	1,2,3,4,5	3	(SHOSHONE RIV	-	_							Fred Burr Pass Freezeout Summit	13011 15810	8000 6600	12	6H 15N	134 274	1957 1937	3,4,5 4,5	2
Crystal Lake Grasshopper	901 1002	7000	19	12N 9N	18E 8E	1941	3,4 3,4	1,2	East Entrance Sylvan Pass	10E6 10E5	7000 7100	17 12	52N 52N	109W 110W	1948 1936	1,2,3,4,5 1,2,3,4,5	6	Gold Creek Lk. Hoodoo Creek	13010 1501 1304	7200 6200 6450	9	8N 14:N รห	1277 2774 1374	1949 1937 1936	4,5 2,3,4	2
Eings Hill Picnic Grounds Pipestone Pass	1001 1206 1201	7950 6500 7200	35 10 10	13N 5N 1N	7E 6W 7W	1934 1941 1938	3,4,5 2,3,4 2,3,4,5	1 1	(NOWOOD CREEK) Wyoming								Intergaard Lubrecht Forest #6 North Fork Jocko		山山00 6330	11	14N 17N	15W 17#	1951 1941	1,2,3,4,5	12 5
Stemple Pass Ten Mile Creek L	1201 1202	6900 6250	16 13	13N 8N	7W 6W	1934 1935	3,4,5	3 3	Cold Springs Camp Medicine Lodge Lb	s 7E2L	8700 9500	1 7	50N 51N	88W 87W	1956 1956	2,3,4,5	1	Pipestone Pass Red Lion	12D1 13C12	72 00 7000	10 27	1N 6N	7W 13W	1938 1958	2,3,4,5 3,4,5	1
Ten Mile Greek M Ten Mile Greek U	12C3 12C4	6300 80 00	13 19	8n 8n	5W	1934 1935	1,2,3,4,5 1,2,3,4,5	3	Munkers Pass North Powder	7E8 7E36	9700 8300	20	48N 47N	85W 85W	1950 1956	2,3,4,5 2,3,4,5	1	Slide Rock Mt. Southern Cross	1302 1305	7100 6500	35	100 5N	16W 13W	1937 1936	2,3,4	1
(TETON RIVER)									Onion Gulch Tensleep Laka Tensleep R.S.	7E27 7E26 7E7	8100 9075 8300	31 33 30	48n 50n 49n	85W 86W 86W	1956 1956 1935	2,3,4,5, 2,3,4,5, 2,3,4,5	1	Stemple Pass Storm Lake Stuart Mill	1201	6900 7780 6500	16 19 19	13N LN 5N	7W 13W 13W	1934 1939 1936	3,4,5 2,3,4 2,3,4	1
Preight Creek Waldron Creek	12 31 1232	6000 5600	13 16 6	26N 25N	10W 9W	1948 1948	3,4 3,4	1	Tyrell R.S.	7E35	8300	30	49N	86W	1956	2,3,4,5	î	Stuart Mountain TV Mountain	1306 1301 1481	7400 6800	6	14N	18W	1936 1956	1,2,3,4,5	1,2
est Fork	1281	6000	6	25N	9₩	1948	3,4	1	(SHELL CREEK)									BITTEPPOOT RIVER	13016	6475	.28	9N	18W	1960	3,4,5	1
(SUN RIVER) Benchmark	1288	5500	9	20N	low	1948	3,4	1	Bald Mountain Beaver-Tongue Div Bone-Spring Div.		9600 9200 9200	33 12 32	56N 55N 55N	91W 91W 8 9 W	1956 1956 1956	2,3,4,5 2,3,4,5	1	East Fork R.S. Gibbons Pess	13 D1 13D2	5400 7100	16	2N 2S	17W 19W	1937 1934	1,2,3,4,5	1 3,1
Cabin Greek 5-Bull	1236	5400 5600	33 36	23N 20N	10W	1949 1948	3,4 3,4	1,2 1,2	Granite Creek Car Granite Pasa		7800 8950	15 19	53N 54N	88M 868 9AM	1956 1956	2,3,4,5 2,3,4,5 2,3,4,5	1	lolo Pass Lost Horse	1405 1407	5230 5940	16 5	38N LH	15E 23W	1956 1960	3,4,5,5 3,4,5	1
Gates Park Goat Mountain	12B5 12B7	5300 7000	31 20	21N 22N	10W 10W	1949 1934	بار3 بار3	1,2	Horse-Trail Div. Ranger Creek		9200 8800	29 32	55N 53N	90W 88W	1956 1935	2,3,4,5	î	Nez Perce Camp Nez Ferce Pass	17101 17105	5580 6575	19& 32	28N	23W 17E	1937 1937	5,415 5,541ر12,311 - 2	151 1
Wrong Ridge erong Greek	1283 1284	6800 5700	17 32	25N 25N	10W 10W	1949 1949	3,4 3,4	1,2 1,2	Shell Creek	7E23	9600	12	52N	88W	1956	2,3,4,5	1	Powoll P.S. Skalkaho Summit Twin Lakos	11,06 1303 14,08	4230 7259 6510	33 30 32	37N 6N 5N	14E 17W 23W	1956 1937 1960	3,4,5,5 4 3,4,5	1 1
(MAPIAS EITER)									(PORCUPINE CA Fiva Spga. Palls		ng 7500	10	CAN	024	3.056	2.2.1.6	2	ST. MARY RIVER	22.00			N RIVER E		1,00	2,417	
Marias Pass	13A5M	5250	34	30N	ТЙМ	1934	1,2,3,4,5	3	Medicine Wheel	7E30	9000	19 24	56n 56n	92W 92W	1956 1956	2,3,4,5	1	Iceberg Lake #3 Josephine Upper	13A3 13A15		48°-5	01	1.13°-431 113°-421	1922 1956	5	3,9
(MILE RIVER)	043	C200	3.0	2610	3/2	1017	2.1		(TONGUE RIVE									Josephina Lower # Mount Allen #7	9 13A14 13A7	4900 5700	180-1	7! 6!	1130-41	1955	5	3,0
Roomy Boy (MISSELSHELL RI	9Al (7ZR)	5200	15	28N	16E	1941	3,4	1	Big Goose #1 Big Goose #2	7E20 7E2 7E32	9200 7700	12	55N 53N	91W 86W	1956 1935	2,3,4,5 2,3,4,5	1	Piegan #6 Ptarmigan #8	13A6 13A8	5500 5800			113°-41 113°-44		5	3,9 3,0
Grasshopper	1002	7000	19	9N	8E	1938	3,4	2	Bone-Spring Div. Burgess R.S. #1		7700 9200 7900	4 32 36	53N 55N 56N	86W 89W 89W	1955 1956 1950	2,3,4,5 2,3,4,5 2,3,4,5	1	W								No. 3
									Burgeas R.S. #2. Dome Lake #1	7£33 7£3	7900 8800	36 11	56N 53N	89W 87W	1955 1950	2,3,4,5 2,3,4,5 2,3,4,5	1	a. Numerale 1,2,						·		may 1.
									Dome Lake #2 Gloom Creek Granite Pass	7E34 7E14 7E17	8800 9300 8950	11 32	53N 55N	87W 87W	1950 1956	۶٫۵٫۴٫۶ ۶٫۵٫۴٫۶	1	b. Numerals refe			seouree	the snow			es: Experiment Sta	ation
										151	0930	19	54N	88W	1956	5,3,4,5	1	2. U.S. Porest 3. U.S. Guologi	Sorvice cal Surve	зу			8.	City of Dominion	Boseman Water & Power	r Rureau
150m 5C3 - MCGr.d - F1.09 - P58																		4. Montana Power 5. U. S. Indlan	Company Service	м	- Soil	Moisture	10.	U. S. Fi	sh and Wildlif reau of Reclar	fe Service mation
																		6. National Park	Service	A	- Aeria	d Marker	12.	Mont.ana	State Forestry	

^{5,}R-1),b3b = (1960)



COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow Survey Data by Tributary Watersheds January 1, 1961

TRIBUTARY WATERSHED	No. of Courses	No. Years	1961 Snow Water Equivalent Expressed as Percent of				
	Averaged	Used	1960	1943-57 Average			
	COLUMBIA RIVER	BASIN IN M	IONTANA				
Flathead	2	8-15	77	86			
Upper Clark Fork	5	6-15	79	64			
Lower Clark Fork	4	5-8	133	87			
Bitterroot	1	8	152	8 0			
	MISSOURI RIVER	BASIN IN M	IONTANA				
Marias, Teton & Sun	1	15	· 8 9	. 77			
Missouri Main Stem	4	15	75	62			
Beaverhead-Jefferson	7	8-15	105	69			
Madison-Gallatin	7	4-15	332	82			
Upper Yellowstone	5	4-11	303	8 5			



MONTANA SNOW SURVEYS ABOUT JANUARY 1, 1961

MISSOURI DRAINAGE

				t Infor		Post	Record	on noon reversable
			Date	Snow	Water		ontent (In.)	Years
No.	Snow Course Name	Elev.	of Survey		Content (In.)	Last Year	15-Year Average 1943-57	Record Used in Average
BEAVER	RHEAD-JEFFERSON BAS	<u>EN</u>						
12E3 12C5 13D2 11E12 12D1 13C7 12C2 12C3 12C4	Camp Creek Chessman Res. Gibbons Pass Kilgore Pipestone Pass Storm Lake Tenmile, Lower Tenmile, Middle Tenmile, Upper	6800 6200 7100 6200 7200 7780 6250 6800 8000	12/29 12/27 12/29 12/29 12/28 12/29 12/29 12/28 12/28	16 6 35 20 15 27 15 20 22	2.6 0.8 9.0 3.6 2.4 5.4 2.6 3.5 4.2	2.3 1.1 5.9 2.0 2.8 4.7 3.3 4.4 6.0	4.3* 2.2 11.2* 4.8* - 3.5 5.4 6.7	14 15 8 13 - 15 15
MADISC	N-GALLATIN BASIN							
11E9 11E5 11E10 10E2 11E6 11E8 11E7	Big Springs Hebgen Island Park Norris Basin Twenty-One Mile Valley View West Yellowstone	6500 6550 6315 7500 7150 6500 6700	12/29 12/28 12/29 12/29 12/28 12/29 12/28	31 24 27 20 30 25 20	6.8 4.2 5.5 4.4 7.0 4.8 4.4	1.5 2.0 1.5 1.4 2.5 1.5 0.8	8.2 5.9 6.3 5.0* 8.6 5.8 5.7	15 15 15 4 15 15
MISSOU	RI MAIN STEM				T T T T T T T T T T T T T T T T T T T			
1205 1202 1203 1204	Chessman Res. Tenmile, Lower Tenmile, Middle Tenmile, Upper	6200 6250 6800 8000	12/27 12/29 12/28 12/28	6 15 20 22	0.8 2.6 3.5 4.2	1.1 3.3 4.4 6.0	2.2 3.5 5.4 6.7	15 15 15 15
MARIAS	S, TETON & SUN BASII							
13A5M UPPER	Marias Pass YELLOWSTONE BASIN	5250	12/28	27	6.2	7.0	8.1	15
10E3 10D7 10E4 10E1 10E2	Canyon Cooke City Lake Camp #1 Lupine Creek Norris Basin	7500 7400 7850 7300 7500	1/2 12/31 1/1 12/30 12/29	28 19 21 22 20	4.9 3.5 3.7 5.0 4.4	1.2 1.9 1.0 1.6 1.4	6.8* 4.1* 4.7* 4.8* 5.0*	11 11 9 4 4

^{*}Average for years of record shown in 1943-57 period.



MONTANA SNOW SURVEYS ABOUT JANUARY 1, 1961

COLUMBIA DRAINAGE

Current Information Past Record												
			Currer	nt Infor			Record					
			Date	Snow	Water	Water Co	ntent (In.)	Years				
	Snow Course		of		Content	Last	15-Year	Record				
No.	Name	Elev.	Survey	(In.)	(In.)	Year	Average	Used in				
							1943-57	Average				
FLATHEA	AD BASIN											
13A2M	Desert Mountain	5600	12/23	26	5.9	8.7	6.0*	8				
13A5M	Marias Pass	5250	12/28	27	6.2	7.0	8.1	15				
13B2M	Spotted Bear Mt.	7000	12/28	25	5.6	6.9	_					
13A12M		3600	12/29	22	4.6	5.9	_	-				
13B11	Twin Creeks	3580	12/27	25	5.7	5.6	-	-				
UPPER C	LARK FORK BASIN											
1205	Chessman Res.	6200	12/27	6	0.8	1.1	2.2	15				
1308	Lubrecht For. #6	4040	1/3	10	1.6	1.3	1.9*	6				
12D1	Pipestone Pass	7200	12/28	15	2.4	2.8		-				
1307	Storm Lake	7780	12/29	27	5.4	4.7	_	-				
1202	Tenmile, Lower	.6250	12/29	15	2.6	3.3	3.5	15				
1203	Tenmile, Middle	6800	12/28	20	3.5	4.4	5.4	15				
1204	Tenmile, Upper	8000	12/28	22	4.2	6.0	6.7	15				
LOWER C	LARK FORK BASIN											
13B10	Coyote Hill	4200	12/30	21	3.8	4.2	5.2*	6				
15B2	Lookout	5250	12/30	57	15.8	11.2	17.4*					
1308	Lubrecht For. #6	4040	1/3	10	1.6	1.3	1.9*	8 6				
14B1	TV Mountain	6800	1/2	35	8.7	6.2		_				
1502	Fish Lake Airstrip	5000	12/28	60	14.6	10.2	16.7*	5				
BITTERR	OOT BASIN											
13D2	Gibbons Pass	7100	12/29	35	9.0	5.9	11.2*	8				
						1						

^{*}Average for years of record shown in 1943-57 period.



AVAILABLE SOIL MOISTURE as of January 1, 1961

Drainage Basin and Station	Station No.	Elev.		Soil Profile in Inches Depth Cap.		Soil Moisture Cont in Inches About 1/ 1961 1960 1959			Y r s	
GALLATIN					र					
College Site	11D2M	4856	54	14.5	12/30	7.1	10.3	8.8	8.0	4
SHIELDS Battle Ridge Shields River	10D11M 10C4M	6020 5850	48 48	13.3 15.9		10.7	_ _	-	- -	- -
FLATHEAD Desert Mountain Marias Pass Spotted Bear R.S. Trout Lake	13A2M 13A5M 13B15M 13A12M	6370 5250 3700 3600	54 54 28 54	6.8 8.4 5.9 11.8	12/23 12/24 12/29 12/29	6.0 4.8 4.2 12.4	7.7 6.6 4.8 11.9	7.4 6.1 5.0 12.5	6.9 5.4 4.5 11.6	4 5 4 4

AVAILABLE SOIL MOISTURE as of October 1, 1960

						1960	1959	1958	Avg.	
GALLATIN College Site	11D2M	4856	54	14.5	9/30	5.8	8.6	6.8	5.8	4
SHIELDS Battle Ridge Shields River	10D11M 10C4M	6020 5850	48 48	13.3 15.9	10/3 10/3	10.6	-	<u>-</u>	-	- -
FLATHEAD Desert Mountain Marias Pass Spotted Bear R.S. Trout Lake	13A2M 13A5M 13B15M 13A12M	6370 5250 3700 3600	54 54 28 54	6.8 8.4 5.9 11.8	9 /2 3 9 /2 6 9/23 9/23	4.5 3.2 0.6 6.9	7.2 5.6 4.3 9.8	5.9 4.5 3.7 10.5	5.5 4.7 3.1 7.9	4644



STATUS OF RESERVOIR STORAGE

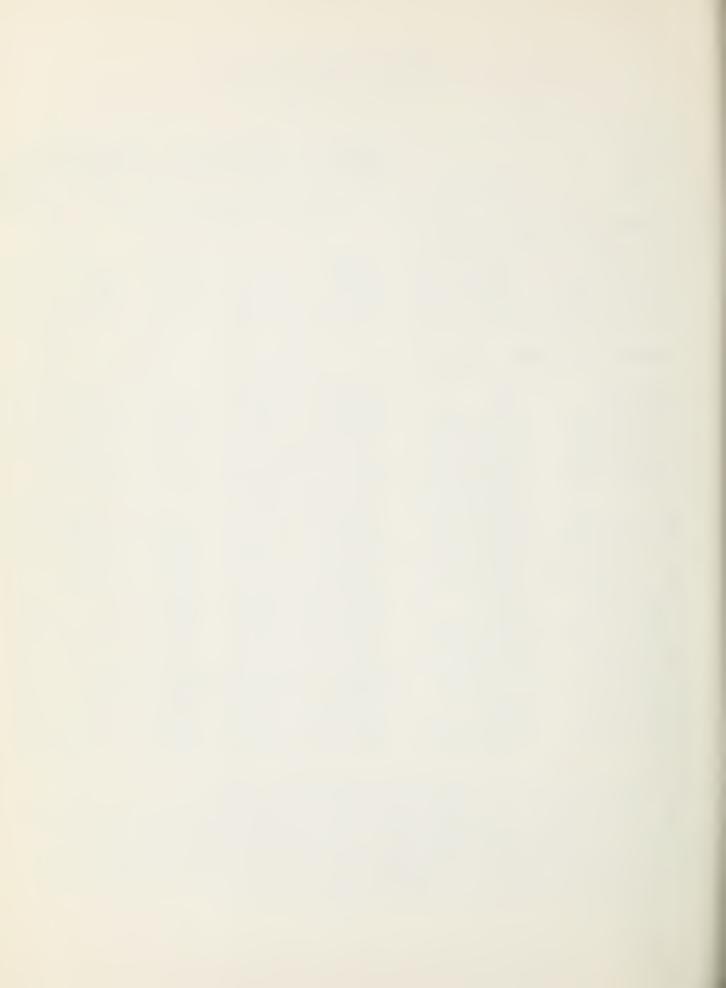
January 1, 1961

	· · · · · · · · · · · · · · · · · · ·					
BASIN		USABLE	USABLE	STORAGE -	1000 ACRE F	
&		CAPACITY			1943-57	Years
STREAM	RESERVOIR	1000 A.F.	1961	1960	Average	Record
			·			Used
COLINGTA DIVER DAG	Thi MONIMANIA					
COLUMBIA RIVER BAS	IN - MONTANA					
Flint Creek	Georgetown Lk.	31.0	27.1	24.6	25.3	15
S. Fk. Flathead	Hungry Horse	3428.0	3423.0	3381.0	2708.6**	
Flathead River	Flathead Lake	1791.0	1260.0	1535.0	1257.1	15
Flathead River 4/	Camas Res.	42.8	22.1	34.1	24.4	15
Flathead River 5/	Mission Valley	98.6	26.6	54.0	28.2	15
MISSOURI RIVER BAS	IN - MONTANA					
Ruby River	Ruby	38.8	13.2	_	17.8**	8
Beaverhead	Lima	84.0	10.5	23.0	32.4	15
Madison River	Hebgen Lake	345.0	129.2	37.0	240.3	15
Madison River	Ennis Lake	41.0	39.1	31.2	37.6	15
Hyalite Creek	Middle Creek	8.0	2.8	3.8	2.9**	
Missouri River	Canyon Ferry	2043.0	1553.0	1734.0	1503.4**	
Missouri River	Hauser &					
,	Helena Lakes	61.9	60.1	59.6	52.4	15
Missouri River	Lake Helena	10.4	9.8	9.6	8.3**	
Missouri River	Holter Lake	81.9	54.8	78.6	71.6	15
N. Fk. Sun River	Gibson	105.0	32.6	69.4	55.5	15
N. Fk. Sun River	Willow Creek	32.3	14.6	13.9	18.4	15
N. Fk. Sun River	Pishkun	32.0	17.2	22.1	19.0	15
Marias River	Tiber	1316.0	625.1	628.8	_	_
Birch Creek	Swift	30.0	11.3	22.6	18.1	15
Dupuyer & Birch	Lake Francis	112.0	78.3	96.3	94.4	15
Musselshell	Durand	7.0	3.4	4.0	4.3	15
Musselshell	Martinsdale	23.1	3.7	6.8	9.5	15
Missouri River	Ft. Peck 3/	19410.0	11530.0	11140.0	11061.0	15
Milk River	Fresno	127.2	29.5	84.6	66.6	15
Milk River	Nelson	66.8	- 43.6	52.6	37.2	15
W. Rosebud Cr.	Mystic Lake	20.8	14.9	14.0	14.4	15
Tongue River	Tongue River	68.0	6.8	14.2	8.2	15
			1			

^{**} Average for years of record shown in 1943-57 base period.

^{3/} Gross contents; usable capacity less 617.0 A.F.; minimum power pool 4,500.0 A.F. 4/ Camas Reservoirs are shown as a sum of four (4) small reservoirs on the west side of Flathead Lake located on Dry Creek and Little Bitterroot River.

^{5/} Mission Valley Reservoirs are shwon as a sum of eight (8) small reservoirs located south and east of Flathead Lake. Both Camas and Mission Valley Reservoirs are operated by the Indian Irrigation Service.



STATUS OF RESERVOIR STORAGE

January 1, 1961

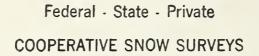
BASIN		USABLE S	STORAGE - 1	000 ACRE FE		
& STREAM	RESERVOIR	CAPACITY 1000 A.F.	1961	1960	1943-57 Average	Years Record Used
MISSOURI RIVER B	ASIN - WYOMING	110 00 0000				
Shoshone River Wind River Wind River Bull Creek Belle Fourche	Buffalo Bill Boysen Pilot Butte Bull Lake Key Hole	440.0 560.0AC 31.6 152.0 190.0AC	124.4 84.7 9.6 57.1 3.1	157.5 178.7 8.0 50.6 0.1	272.4 309.2** 9.1 80.4 10.3**	15 5 15 15 5
MISSOURI RIVER BA	ASIN - NORTH DAKOT	<u> </u>				
Heart River Heart River Missouri River James River	Lake Tschida E. A. Patterson Garrison Lake Jamestown	68.7AC 5.6AC 18100.0AC 220.0AC	50.0 3.5 5968.0 15.7	45.8 3.9 4026.7 8.4	53.6** 3.6** -	7 6 - -
MISSOURI RIVER BA	ASIN - SOUTH DAKOT	<u> </u>				
Belle Fourche Cheyenne River Cheyenne River Grand River Missouri River Missouri River Missouri River Cheyenne River	Belle Fourche Angostura Deerfield Shadehill Ft. Randall Gavins Point Oahe Pactola	185.2AC 90.0AC 15.1AC 84.0AC 3800.0AC 320.0AC 17000.0AC 55.0AC	16.1 2.0 2.1 52.3 2373.7 302.0 190.0T 15.7	20.5 16.0 1.0 70.4 2289.6 236.3 205.0T 23.5	84.8 44.3** 12.3** 76.3** - -	15 6 10 5 -

^{**} Average for years of record shown in 1943-57 base period. AC Active Capacity; USBR Billings.

T Total Storage.







Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"